FLOATGEN

# Report on general regulation aspects (Demo 1)

## Deliverable nº: 2.1


EC-GA nº 295977

Project full title: Demonstration of two floating wind turbine systems for power generation in mediterranean deep waters

.

# Deliverable Nº 2.1

# Report on general regulation aspects

**Responsible Partner: GAMESA**

**Due Date of Deliverable: 31/03/2013**

**WP: 2**

**WP leader: GAMESA**

**Task: 2.1.- General regulation aspects**

**Task leader: GAMESA**

**Version: 1**

**Version date: 22/03/2013**

**Written by:** GAMESA

**Checked by:** GAMESA

**Approved by:** GAMESA

**Dissemination level:** PU

## Document history

| Version | Date | Main Modification | Written by | Checked by | Approved by |
|---|---|---|---|---|---|
| **1** | **22/03/13** | **-** | GAMESA | GAMESA | GAMESA |


**Brief Summary**

There are not many deep off-shore floating systems hosting wind energy turbines nowadays. Therefore, in the first step of FLOATGEN project, it is necessary to analyze and establish all requirements in terms of authorization, permissions, general regulations, certifications, environmental impact, safety aspects, etc, to be fulfilled by project partners.

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## 1. EXECUTIVE SUMMARY

The objective of task 2.1 is to establish which are the main regulation aspects that the project and each partner must fulfill in terms of administrative authorizations, general and specific legislation, project execution approval, certifications,

Nowadays, there are a little codes and guidelines specific to floating offshore wind turbines. However, this information will be collected in this document with the idea to be a summary to clarify the existing standards and legal framework surrounding floating offshore wind energy installations.

The report is valid for the European Union, and collects both the main International and European legislation, focusing on national requirements in Spain in where FLOATGEN prototype will be expected to install it.

Different kind of legislation applicable to floating offshore wind turbines and installations will be considered in this document:

- General legislation and administrative procedures.
- Environmental standards.
- H&S standards.

## 2. ACRONYMS

| | |
|---|---|
| H&S | Health & Safety |
| IMO | International Maritime Organization |
| TSS | Traffic Separation Schemes |

## 3. AIM

The aim of this document is to collect and establish the main standards and regulation requirements concerned with the Floatgen wind turbine project. This report includes information on legal, policy and administrative issues relative to offshore wind farm projects.

## 4. SCOPE

This document is applicable to the Floatgen wind turbine prototype.

## 5. LEGAL FRAMEWORK

### 5.1 GENERAL OVERVIEW

Currently, the legal framework for offshore wind exploitation in the European Union (EU) Member States (MS) may be considered as a patchwork combination of national, EU and international level legislation, each applicable to one or several stage in the development and implementation of an offshore wind farm.

In general, legal aspects and hierarchy for the development, exploitation and decommissioning of offshore wind farms will be as it is shown in the following figure.

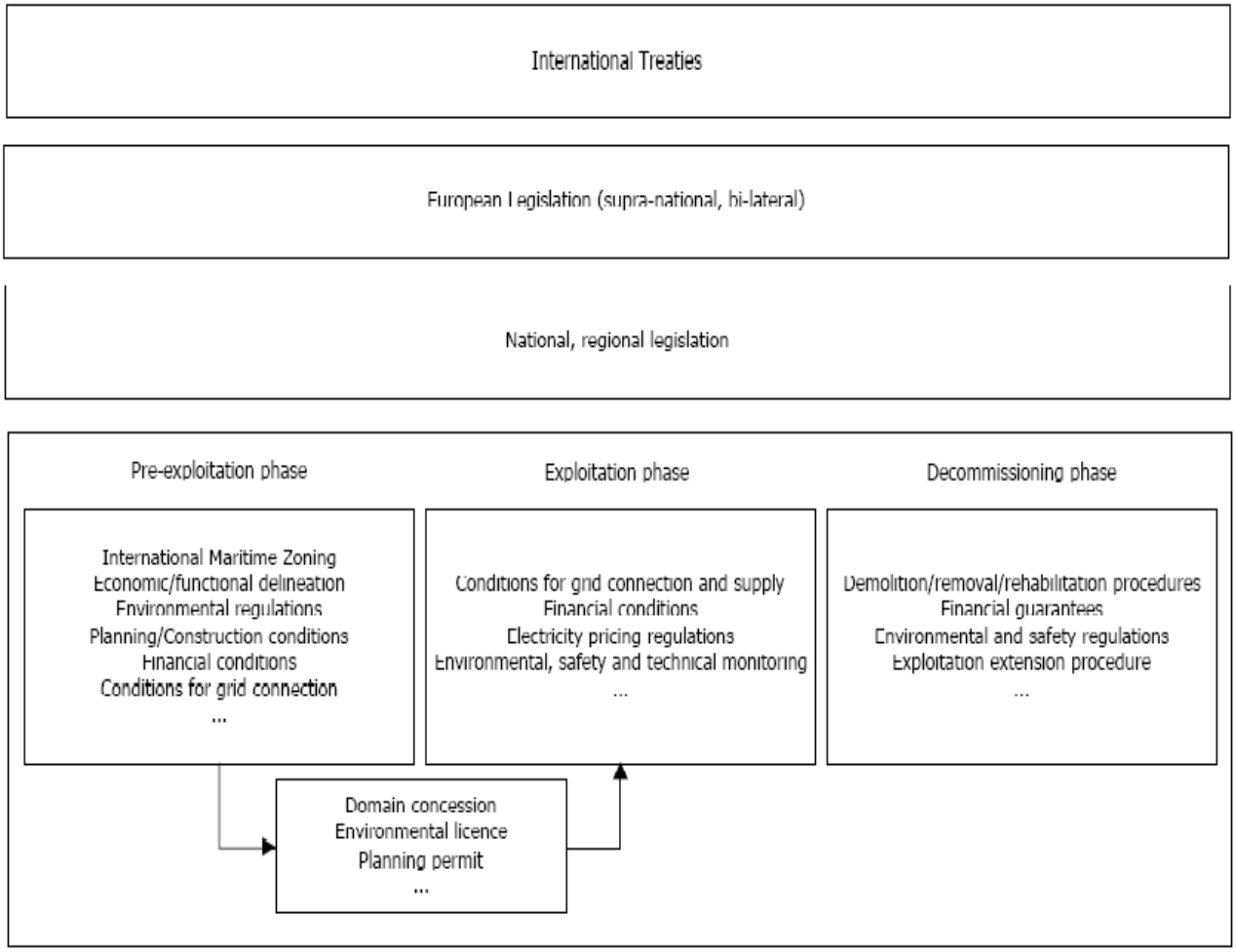


**FIGURE 1.- LEGAL STRATIFICATION AND HIERARCHY FOR DEVELOPMENT, EXPLOITATION AND DECOMMISSIONING OFFSHORE WIND FARMS.**

However, legal and administrative requirements in each country are different, as regards the procedure for implementation of an offshore wind farm in the seas within the country's jurisdiction.

Certain zones in the sea are less suited to, or cannot be considered for the construction of wind farms due to the fact that they are reserved for activities that are not compatible with offshore wind energy generation, mainly for the sake of safety of shipping. International shipping activities are regulated within the International Maritime Organisation (IMO), which is a specialised organisation of the United Nations.

## 5.2 MAIN INTERNATIONAL LEGISLATION

According international legislation, several international agreements contain important obligations which significant implications for offshore wind projects. Excluding environmental policies, the most important are:

- **Convention on the International Regulations for Preventing Collisions at Sea (COLREG 1972)**

  This is the main convention for regulating international maritime traffic. It specifies the "rules of the road" for particular traffic situations and organises the traffic flow by means of “traffic separation schemes” (TSS), the aim of which is to separate opposite-going traffic in high traffic density areas such as the Dover Strait, Gibraltar Strait, etc.

  The area between land and a traffic separation scheme is called an “inshore traffic zone”. A vessel of more than 20 meters in length, except fishing vessels, shall not use an “inshore traffic zone” when it can safely use a traffic lane within the adjacent traffic separation scheme, except when on route to or from a port.

- **International Convention for the Safety of Life at Sea (SOLAS 1974/78)**

  The SOLAS Convention introduces (Chapter V, regulation 8) the possibility to establish “areas to be avoided” and other routing measures. These ships’ routing systems contribute to the safety of life, safety and efficiency of navigation and/or the protection of the marine environment. Ships’ routing systems are recommended for use by, and may be made mandatory for, all ships, certain categories of ships or ships carrying certain cargoes, when adopted and implemented in accordance with the guidelines and criteria developed by the IMO.

  An “area to be avoided” is a routing measure comprising an area with defined limits in which navigation is particularly hazardous or it is exceptionally important to avoid casualties and which should be avoided by all ships or certain classes of ships.

- **The United Nations Convention on the Law of the Sea (LOSC 1982)**

  The LOSC reconciles global or community needs with the demands of national sovereignty and jurisdiction. It is in this sense that the Convention as a whole has struck an important balance between the protection of the marine environment and use of the ocean and its resources. In the exclusive economic zone (EEZ) the coastal state has sovereign rights.

Regarding fishery areas and according to the LOSC, coastal states have sovereign rights in a 200-nautical mile EEZ over natural living resources.

Also, the coastal state may in its EEZ or above its continental shelf, where necessary, establish reasonable safety zones around the artificial islands, installations and structures, in which it may take appropriate measures to ensure the safety of navigation and of the artificial islands, installations and structures. The breadth of these safety zones shall be determined by the coastal state, taking into account applicable international standards. The designation of such zones must be reasonably related to the nature and function of the artificial islands, installations or structures. Furthermore, they are not to exceed a distance of 500 metres around them.

## 5.3 MAIN EUROPEAN UNION LEGISLATION

In addition to international agreements and legislation, there are also European Union (EU) policies and directives of relevance in offshore wind exploitation. Some of them are the following (excluding environmental standards which are treated in chapter 7):

- **Council Regulation (EU, Euratom) No 617/2010 of 24 June 2010**

  Concerning the notification to the Commission of investment projects in energy infrastructure within the European Union and repealing Regulation (EC) No 736/96, this Regulation establishes a common framework for the notification to the Commission of data and information on investment projects in energy infrastructure in the oil, natural gas, electricity, including electricity from renewable sources, and bio-fuel sectors, and on investment projects related to the capture and storage of carbon dioxide produced by these sectors.

  Member States may furthermore submit any estimated data or preliminary information on investment projects of the types listed in the Annex on which construction work is scheduled to start within five years and to those which are scheduled to be decommissioned within three years, but for which a final investment decision has not been taken.

- **Commission Regulation (EU, Euratom) No 833/2010 of 21 September 2010**

Implementing Council Regulation (EU, Euratom) No 617/2010 concerning the notification to the Commission of investment projects in energy infrastructure within the European Union.

- **Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009**

  On the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC, this Directive establishes a common framework for the promotion of energy from renewable sources. It sets mandatory national targets for the overall share of energy from renewable sources in gross final consumption of energy and for the share of energy from renewable sources in transport. It lays down rules relating to statistical transfers between Member States, joint projects between Member States and with third countries, guarantees of origin, administrative procedures, information and training, and access to the electricity grid for energy from renewable sources.

- **Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001**

  On the promotion of electricity produced from renewable energy sources in the internal electricity market, the purpose of this Directive is to promote an increase in the contribution of renewable energy sources to electricity production in the internal market for electricity and to create a basis for a future Community framework thereof.

  In addition, the definitions in Directive 96/92/EC of the European Parliament and of the Council of 19 December 1996 concerning common rules for the internal market of electricity shall apply.

- **The Common Fisheries Policy (1992)**

  The EU has the exclusive rights with respect to the exploitation of fish stock in the EU Fisheries zone that mostly coincides with the EEZ of the Member States. EU regulations for fishery were developed on the basis of scientific advice from the International Council for the Exploration of the Sea (ICES).

  The Common Fisheries Policy relates to exploitation activities involving living aquatic resources, and aquaculture, as well as to activities involved in the processing and marketing of fishery and aquaculture products. The main objective of this regulation is to prevent over-fishing and to restore fishery resources by determining quota and technical measures.

- **The European Water Policy**

  This Directive establishes a framework for Community action in the field of water policy, notably the protection of inland surface water, transitional waters, coastal waters up to one nautical mile, and ground water. Although this Directive applies mainly to inland waters, it also aims to contribute towards enabling the Community and Member States to meet their commitments under various international agreements containing important obligations on the protection of marine waters.

## 5.4 NATIONAL REQUIREMENTS AND ADMINISTRATIVE PROCEDURES

Besides international and European standards and policies, every state in the EU has its own particular laws and rules in relation to seas exploitation that impacts into offshore wind farms projects. Because of that, requirements for offshore wind farms are not the same in all EU countries, as well as administrative procedures, acquiring concessions, licenses, and so on. The amount of permits required for offshore wind energy development, as well as the number of competent authorities directly involved in the permitting process, differ considerably in each country. In all EU countries more than at least one authority is directly or indirectly involved. The competent authorities in each country should clearly specify all information to meet those specific national requirements.

According to international law, all countries bordering on a sea possess territorial rights to a part of this sea. For all countries territorial jurisdiction extends to a maximum of 12 nautical miles (12 nm) from the coastline. All countries have also established an Exclusive Economic Zone (EEZ) or another similar zone, in which they can exercise functional jurisdiction, pertaining, among other things, to wind farms. The zoning of the marine area is, therefore, essentially the same in all countries. However, the size and nature of the area for offshore wind energy may vary greatly for each country. This area is always defined geographically by the size of the relevant EEZ or similar zone, which is different for each country.

For instance, The United Kingdom's REZ (Renewable Energy Zone), by far exceeds the size of the Belgian EEZ. The extent to which the available area can be used for offshore wind energy development or is taken up by other activities in these zones (such as shipping and mining) may vary greatly as well. Around the main port of Rotterdam, for instance, shipping lanes will take up much more of the area than those in several of the other countries.

The differences in the stages of development of offshore wind energy in the eight countries are significant regarding the regulatory framework. Some of the countries have a longer history in offshore wind energy development and have altered their regulatory framework or consent regime to streamline and establish permit procedures (UK, Germany, Denmark, and The Netherlands). Whilst other countries have only recently given shape to their regulatory framework and are dealing with the first applications.

The permits listed below only concern the construction and exploitation of the installation at sea and the cables for connection to the onshore electricity grid. Not included are, for instance, the permits required to cross the coastal zone (such as dunes) and installing cables onshore to the nearest grid connection point. Generally, this will involve the competent authorities of municipalities as well. The number of permits required for 'coastal crossing' and installing cables in municipal grounds will vary for each situation (e.g. 'obstacles' on the onshore route to the nearest grid connection point) and for each country. It should be taken into consideration that acquiring these various permits may take some time and should preferably be streamlined or co-ordinated by a competent body.

The permits mentioned are only a general overview of the different administrative schemes required in each country. For more details, competent authorities in each nation must be consulted. This is the general summarize of necessary permits in several EU nations (source: European Commission and Concerted action offshore wind energy Deployment (COD)):

- **Germany;** within EEZ, 3 permits required:
  1) A licence to establish and exploit the wind turbine
  2) A licence for the establishment and exploitation of the electricity cables
  3) A licence for the construction of cables in territorial waters on the basis of the Federal Mining Act.

  Within 12 nm zone, approvals and 2 permits are required**:
  1) An approval in a regional planning procedure for the wind farm site and the sea cable.
  2) A licence on the basis of the Federal Emission Control Act (Bundesimmissionsschutzgesetz)
  3) A licence for the construction of cables in territorial waters on the basis of the Federal Mining Act.

- **Denmark;** 5 permits required:
  1) A permit for preliminary survey with the obligation to carry out an EIA (the EIA is subject to public hearing)
  2) A permit to establish the installation: a building permit including cables (subject to public hearing)
  3) A permit to exploit wind energy
  4) An additional permit to produce electricity at installations with a capacity of more than 25 MW (not particularly wind energy; all existing electricity producing companies with power production larger than 25 MW must be awarded such a licence. Each enterprise will only need one permit – independent on the amount of power production installations.)
  5) A permit for the construction of cables for a new electricity transmission grid in territorial waters and the EEZ (until now, the transmission companies have been responsible for, and have covered the costs of the installation of the grid connection of the Danish large scale offshore wind power plants).

- **Netherlands;** 1 permit required:
  1) Wbr permit: planning permission for building, exploiting, maintaining and removing the wind farm, including platforms and cables (at sea).

- **Belgium;** 3 permits required:
  1) A concession: the right to solely occupy a parcel of the Belgian maritime area
  2) A licence, needed for the operation of a wind far
  3) An authorisation, needed for the building of the construction.

- **United Kingdom;**

  Via Route 1, at least 3 permits required:
  1) Electricity Act 1989 consent (permitting construction and operation of a generating station)
  2) Coast Protection Act 1949 consent (permitting coastal works that may affect navigation)
  3) Food and Environmental Protection Act (FEPA) licence (permitting deposition in the sea)
  4) Other consents if required

  Via Route 2, at least 2 permits required:
  1) Transport and Works Act 1992 (TWA) Order (permitting electricity generation and coastal works)

2) FEPA licence (permitting deposition in the sea)
3) Other consents if required

For establishment in REZ, 2 permits required

1) Consent under section 36 of Electricity Act 1989
2) Licence under FEPA section 5

- **Sweden**

Within 12 nm Zone, 6 permits required:

1) Permit to use public waters
2) Government permit for exploration (also for cabling)
3) Building licence
4) Concession for electrical cables
5) Licence for laying, building and maintaining cables within privately owned waters
6) Government environmental permit

Within EEZ, 2 permits required:

1) Government permissions for exploration (also for cabling)
2) Permit according to Swedish Exclusive Economic Zone Act

- **Poland;** 5 permits required:

1) Preliminary building condition
2) Licence to exploit the area
3) Licence to construct the wind farm
4) Licence to connect the wind farm to the grid
5) Concession for renewable energy production

- **Ireland;** 5 permits required:

1) Foreshore Licence to allow for the investigation of the suitability of a site is normally required
2) Foreshore Lease for the construction and operation of offshore electricity generating stations
3) An authorisation to construct a generating station
4) A licence to generate electricity
5) A licence to supply electricity

- **Spain;** 6 permits required:

1) Area reservation
2) Administrative authorization
3) Environmental Impact Declaration
4) Concession of the maritime-terrestrial public dominion
5) Project Execution Approval
6) Registration in the Power Production in the Special Regime Register

In Spain, the most important regulations currently applicable are:

- Relating to electric energy generation sources installations:
  - Law 54/1997, of November 27 on the Electricity Industry.
  - Royal Decree 1955/2000, of December 1: it regulates the transmission, distribution, marketing, supply and authorization procedures for electric power facilities.
  - Royal Decree 1028/2007, of July 20: it establishes the administrative procedure for processing applications for the authorisation of electricity generating facilities in territorial waters.
  - Royal Decree 661/2007, of May 25, regulating the activity of electricity generation under the special system.
  - Resolution of 30 April 2009, of the Secretariat for Energy and the Secretariat of the Sea together, approving the Environmental Impact Assessment for the installation of offshore wind farms.

- Relating to the occupation of marine-terrestrial public property or dominion, the following laws and regulations area applicable:
  - Spanish Coastal Law 22/1988 of July 28.
  - Royal Decree 1471/1989 of December 1 from the Ministry of Public Works and Urban Affairs that approves the General Regulation to develop and implement Law 22/1989 on Coasts.

The legal framework for the regulation of the Environmental Impact Assessment (EIA) procedure is the following:

- Legislative Royal Decree 1302/1986 of June 28, on Environmental Impact Assessment.

- Law 6/2001 of May 8, which includes modifications to the Legislative Royal Decree 1302/1986, of June 28, on Environmental Impact Assessment.
- Legislative Royal Decree 1/2008, of January 11, passing the consolidated text of the Law on the Environmental Impact of Projects.

Relating to the obtaining of the permits/consents required for the installation of offshore wind farms in the Spanish Coast, there is the **Royal Decree 1028/2007, of July 20**, establishing the administrative procedure for processing applications for the authorisation of electricity generating facilities in territorial waters.

The ***Royal Decree 1028/2007*** defines the administrative procedure to apply for the permits required for a marine power plant. This procedure is affected by the following Spanish regulations:

- Article 112 Royal Decree *1955/2000*, 1st December.
- *Law 22/1988*, 28th July.
- Article 70 *Spanish Coastal Law 22/1988, July 28.*
- Article 137 *Reglamento General 1471/1989*, 1st December.

All the applicable national regulations are collected together in one administrative proceeding according to the *Royal Decree 1028/2007* and this procedure includes the application for the following authorizations:

- Area reservation.
- Obtaining the administrative authorization.
- Obtaining the approval for the project execution.
- Registration in the Register of Power Production in the Special Regime.

Permits required will be competence of the following Spanish Ministries:

- *The Ministry of Industry, Tourism and Trade through the General Directorate for Energy Policy and Mines* has the power to authorize the construction, modification and decommissioning of the Offshore installations.

- *The Ministry of Environment and Rural and Marine Affairs through the General Directorate for Coasts*, has the power to authorize and give the concession to the occupation of the maritime-terrestrial public dominion.
- *The Ministry of Infrastrucure through the General Directorate for Merchant Marine,* has the power to authorize those activities who affect to the maritime security, navigation and human life in the sea.
- *The Ministry of Infrastructure and The Ministry of Agriculture, Fishing and Food* has the responsibility to adopt the measures required to ensure the protection and regeneration of the fishing resources of the area.

The installation of offshore wind farms at sea requires prior studies, test, and analysis that, due to the grand scale of the projects, and the lack of previous experience, need to cover an extensive period of time. For these reason, the law foresees that the promoters will be given a reserved territory with an investigation permit during a specific period of time before the concession of exploitation.

As said before, these are the main permits required in Spain:

1) Area reservation

2) Administrative authorization

3) Environmental Impact Declaration

4) Concession of the maritime-terrestrial public dominion

5) Project Execution Approval

6) Registration in the Power Production in the Special Regime Register

**1) Area reservation**

First of all, a particular interested party submits an application to *the Ministry of Industry, Tourism and Trade, to the General Directorate for Energy Policy and Mines*, to shown its interest in a specific area and to reserve it for previous studies and assessments before applying for the authorization of the installation of an Offshore Wind farm in the selected area.

This application contains the following information:

- Legal, technical and financial capacity expertise of the applicant.
- Project summary including a description of the area selected and the assessments to be done in the area.

- Project proposal, including a report, plans and the budget.
- Offprint to the Public Administration and Public enterprises with interest on the project.

After receiving the area reservation application, it is necessary to determinate the ***Marine Area Characterization***. In this next step, *The General Directorate for Energy Policy and Mines* determines which zones of the selected area, are more suitable and present a minor impact in the environment and in the shipping and maritime transport. With this purpose it is done a site pre-screening and a global evaluation of different aspects (environmental, tourism, fishing, shipping impact and grid connection). It is necessary to define in five years time scale, the estimated maximum access capacity of the nearest electrical networks and the maximum power capacity to install.

The ***Marine Area Characterization*** will be valid for a five years period and once the marine area characterization report is officially published by *the General Directorate for Energy Policy and Mines*, it is opened the competition procedure. There is a three months period to present the applications. Those interested have to submit an application in the time period established in the order and after that, a committee will evaluate the different request received. The promoter who presents the best project will be given the authorisations necessary for the construction and use of the offshore wind farm.

Once the competition procedure period is finished, there is a three months period to publish a resolution. The evaluation of the projects will be carried out by an Evaluation Committee which will present a proposal of resolution to the General Secretary of Energy. Afterwards, the General Secretary of Energy will publish a resolution in the following month, determining the attribution of the area reservation to the interest party selected by the committee.

**2) Administrative authorisation.**

The procedure to obtain the administrative authorization is explained in the Royal Decree 1028/2007.

This procedure starts with resolution publication about the reserved area. The reserved area assigned to the promoter enables said promoter to exclusively carry out the investigation of wind resources in the corresponding area. This exclusive right is granted for a maximum time of

two years, extendable by one more year, after showing proper justification, due to causes attributable to the Public Administration or to force majeure.

Once all the assessments and studies in the area are finished, the promoter will apply for the administrative authorization. This application will content the following aspects:

- Update of the documentation submits for the area reservation.
- Environmental Impact Assessment.
- Application for the inclusion in the Special Regime.
- Marine-terrestrial public dominion occupation project.

**3) Environmental Impact Declaration.**

The environmental evaluation is a previous step to obtaining the administrative authorisation and the concession of the maritime-terrestrial public dominion. The procedure follows the established contents on the Legislative Royal Decree 1/2008. The assessments are competence of the *Ministry of Environment.*

This evaluation starts with the competition procedure, with an initial environmental assessment. Once the facility authorisation is applied, the document is transmitted to the Environmental body in order to establish the Environmental Impact Assessment in a 6 months period.

**4) Concession of the maritime-terrestrial public dominion.**

The procedure for the obtaining the permit for the occupation of marine-terrestrial public property or dominion is according to the Royal Decree 1955/2000. This is competence of the *General Directorate for Energy Policy and Mines*. The resolution must be published in three months once the permit has been applied.

**5) Project Execution Approval.**

The administrative procedure is established in the Royal Decree 1955/2000. This is competence of the *General Directorate for Energy Policy and Mines.*

Also, it is necessary to obtain a *Commissioning Certificate* as established in the Royal Decree 1955/2000. This is competence of the *General Directorate for Energy Policy and Mines.*

The promoter applies for the Commissioning Certificate once the wind farm has been built and the works are finished. The Commissioning Certificate should be extended in a month period, having the possibility of obtaining a previous Commissioning Certificate for testing.

**6) Registration in the Power Production in the Special Regime Register.**

The procedure to register the plant in the Power Production in the Special Regime Register is explained in the Royal Decree 661/2007. This is competence of the *General Directorate for Energy Policy and Mines.*

## 6. ENVIRONMENTAL LEGISLATION

### 6.1 GENERAL OVERVIEW

With regard to the planning and the establishment of an offshore wind park, various measures must be observed for ensuring the protection of the environment. As occurs in general legislation view in chapter 6, some are international standards and others are only applicable to the European Union or a specific country.

Specific administrative rules or procedures have been established to ensure that the environmental impact of human activities is sufficiently assessed, and that any possible adverse impacts are avoided or minimised. Additionally, specific environmental programmes have led to the delineation of protected areas wherein certain human activities are restricted or forbidden. Both of these measures could act to restrict offshore wind developments.

On the other hand, other environmental programmes may have an indirect and/or positive impact on the establishment of offshore wind developments. For instance, programmes aimed at reducing the emission of greenhouse gases generally encourage renewable energy projects, including offshore wind energy.

The following sections overview the various environmental regulations of relevance to offshore wind energy projects.

## 6.2 MAIN INTERNATIONAL LEGISLATION

- **The United Nations Framework Convention on Climate Change (UNFCCC) (1992) and the Kyoto Protocol (1997)**

  Under the Framework Convention, Parties accepted a number of important principles relevant to the issue of climate change. Parties acknowledged recognition of climate change as a common concern of mankind (preamble), and also the importance of a number of principles in tackling the problem, such as: common but differentiated responsibilities, and the precautionary principle.

  Furthermore Parties have the obligation to make inventories of anthropogenic emissions of greenhouse gas gases (GHGs) from sources, and their removal by sinks, and to co-operate and stimulate technology transfer from developed to developing countries. Parties are also required to implement measures so as to reduce their collective emissions of greenhouse gases to 1990 levels with a view to minimising human induced climate change and related adverse impacts.

  The Kyoto Protocol shares the principles set out in the Climate Change Convention and introduces new and stringent commitments to reduce GHG emissions by setting legally binding targets and timetables for developed countries.

- **Convention on Environmental Impact Assessment (EIA) in a Transboundary Context (Espoo, 1991)**

  This convention obliges Parties to assess, at an early stage of planning, the environmental impact of certain projects entailing possible transboundary impacts. It also lays down the general obligation of states to notify and consult each other on all major projects under consideration that are likely to have a significant adverse environmental impact on a transboundary level.

  It is important to note that the Convention does not establish an international EIA-procedure but that it outlines specific conditions to be incorporated into national environmental impact assessment procedures

- **The Energy Charter Treaty (1994)**

This treaty specifically subjects certain activities in the energy sector to an EIA. According to the specific provisions of the treaty, states are required to “minimise in an economically efficient manner harmful Environmental Impacts occurring either within or outside its Area from all operations within the Energy Cycle in its Area”. This is to be done through taking precautionary measures and using the polluter pays principle. The treaty specifically requires Parties to “promote the transparent assessment at an early stage and prior to decision, and subsequent monitoring, of Environmental Impacts of environmentally significant energy investment projects”.

This implies that offshore wind energy projects undertaken by Parties to this Treaty would be subject to an EIA.

- **The International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78)**

  MARPOL 73/78 and amendments apply to ships of all types and cover all technical aspects to prevent and reduce pollution from ships, with the exception of the disposal of waste into the sea by dumping.

  MARPOL 73/78 covers operational and accidental pollution from ships. A new feature was the concept of "special areas". The 1973 Convention identified the Mediterranean Sea, the Black Sea, the Baltic Sea, the Red Sea and the Gulf area as special areas. Under Annex I, the Gulf of Aden, Antarctica, the North Sea, Irish Sea, Celtic Sea and English Channel have been added. In “special areas” more stringent discharge standards apply and ports bordering these areas have to supply sufficient reception facilities. MARPOL has two Protocols dealing, respectively, with Reports on Incidents involving Harmful Substances and Arbitration, and six Annexes, which contain regulations for the prevention of various forms of pollution.

- **Convention on the Prevention of Marine pollution by Dumping of Wastes and other Matter (London, 1972 - LC)**

  The London Convention (LC) regulates “dumping at sea” on a universal level. Dumping means the deliberate disposal at sea of wastes or other matter from vessels, aircraft, platforms or other man-made structures, as well as the deliberate disposal of these vessels, aircraft or platforms themselves.

In the beginning, the LC (then called the London Dumping Convention or LDC), allowed dumping of wastes under certain conditions, depending on the substances to be dumped and the allocation of those substances. In 1993, a resolution was adopted to ban the dumping into sea of low-level radioactive substances, to ban the incineration at sea of industrial waste and to phase out the dumping of industrial waste by the end of 1995. In 1996 a Protocol was adopted to replace the 1972 Convention. This Protocol introduces a general prohibition on dumping of any wastes or other matter at sea, with the exception of those materials explicitly mentioned.

- **The Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (the Barcelona Convention (1995), (the amended version of the Barcelona Convention of 1976)) and its Protocols**

  Since its adoption by all Mediterranean states and the EC, the Mediterranean Action Plan (MAP) has served as the basis for the development of a comprehensive environment and development programme in the region involving the Mediterranean coastal states, specialised organisations of the United Nations system, Intergovernmental and Non-governmental Programmes and Organisations. The Action Plan (MAP) covers coastal zone management, pollution assessment and control, protection of ecosystems and preservation of bio-diversity. In 1995, it was revised to become more action-oriented and an instrument for sustainable development in the region.

- **The Convention on the Protection of the Marine Environment of the Baltic Sea Area (1992)**

  The 1992 Helsinki Convention can be considered as one of the most progressive regional marine environmental protection conventions in existence today. This is the successor of the 1974 Helsinki Convention. The present contracting parties to Helsinki Convention are Denmark, Estonia, European Community, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden.

  The Contracting Parties undertake to prevent and eliminate pollution of the Baltic Sea caused by harmful substances from all sources. For the prevention of pollution from land-based sources, parties are required to co-operate in the development and adoption of specific programmes, guidelines, standards or regulations concerning emissions and inputs to water and air, environmental quality, and products containing harmful substances and materials and the use thereof. The Convention provides for measures on the prevention of pollution from ships, the prohibition of incineration and the exploration and the exploitation of the seabed and the

subsoil thereof. It updates the definition of dumping to specifically include disposal into the seabed, and prohibits all dumping except for dredged material.

- **Fifth North Sea Declaration (Bergen, 21 March 2002)**

  In the fifth North Sea Declaration, the Ministers of Environment from the North Sea states politically agreed upon the promotion of renewable energy. The Ministers welcomed the development of renewable energy technology, inter alia, offshore wind energy, as offering the potential to make a significant contribution to tackle the problems of climate change. They agreed to take action in order to exploit this potential fully and safely, taking into account the global and European commitments linked to the Kyoto protocol. The Ministers from the EU Member States affirmed their commitment to implement the EU Directive 2001/77 on renewable energy, as part of their commitment to the Kyoto protocol on climate change.

- **The Convention on Wetlands of International Importance especially as Waterfowl habitat (Ramsar, 1971)**

  The Ramsar Convention provides the framework for national action and international co-operation for the conservation and wise use of wetlands and their resources. For the purpose of the Convention, wetlands are areas of marsh, fen, peat land or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six metres.

- **Bern Convention on the Conservation of European Wildlife and Natural Habitats (1979)**

  The Convention was drawn up within the Council of Europe by an ad hoc Committee for the Protection of Wild life. The aims of the Convention are threefold: to conserve wild flora and fauna and natural habitats, to promote co-operation between States, and to give particular attention to endangered and vulnerable species, including endangered and vulnerable migratory species. It is an important instrument for the protection of wildlife and natural habitats. To-date the Convention has 44 Contracting Parties, including 39 Council of Europe member States, the European Community, Monaco and three African States.

- **Convention on the Conservation of Migratory Species of Wild Animals (1979) (Bonn Convention)**

Under this Convention, Parties acknowledge the need to take action to avoid the endangerment of migratory species. In particular the Parties undertake to promote, co-operate in, and support research relating to migratory species. In addition, Parties are to endeavour to provide immediate protection for migratory species.

- **The Convention on Biological Diversity (1992)**

  This Convention stipulates an obligation for the contracting parties to develop strategies, plans or programmes for the conservation and sustainable use of biological diversity and also offers the possibility to create a network of protected areas.

- **The OSPAR Convention (1992)**

  In 1998, annex V to the Ospar Convention was adopted. This Annex stipulates that the contracting parties to this treaty shall designate protected maritime areas, draw up programmes and measures for the control of the human activities that affect ecosystems and biological diversity, and institute protective, conservation, restorative or precautionary measures related to specific areas or sites or related to particular species of habitats.

## 6.3 MAIN EUROPEAN UNION LEGISLATION

- **Environmental Impact Assessment Directive (1985)**

  This Directive establishes a procedure to enable decision-makers to make appropriate decisions regarding the environmental impact of proposed projects falling under specified categories. The main objective is to introduce general principles for the assessment of environmental effects with a view to supplementing and co-ordinating development consent procedures governing public and private projects. In keeping with the principle of subsidiary, each MS decides on the particular policies and measures needed to implement the Directive.

  In the context of offshore wind energy projects, it should be noted that activities concerned with offshore wind generation are not contained in the list of Annex I projects. However, the installations for the harnessing of wind power for energy production (wind farms) are included in Annex II and, in taking into account the criteria of Annex III, each MS can decide whether the project shall be subject to an assessment. Given the criteria listed in Annex III, it has to be assumed that offshore wind farms must be subject to an EIA.

- **The "Strategic" Environmental Impact Assessment Directive (2001)**

  The EIA Directive of 1985 (as amended by Directive 97/11/EC) describes the EIA procedure on the project-level. The so-called Strategic Directive provides that an environmental assessment must be carried out for plans and programmes which are likely to have significant environmental effects. It relates in particular to agriculture, forestry, fisheries, energy, industry, transport, and town and country planning or land use, and sets out the framework for the future development consent of projects listed in an annex.

- **EC Sixth Environmental Action Programme (2001)**

  Climate change is one of the four priority action areas established under this Programme. Here, the immediate objective of the Programme is the achievement of the Community's 8% emission reduction target for 2008-2012, as required under the Kyoto Protocol.

  The approach for achieving the objectives signifies important changes for the energy sector. The Programme points to the need for structural changes especially in the transport and energy sectors, and calls for stronger efforts in energy-efficiency and energy-saving, the establishment of an EU-wide emissions trading scheme, further research and technological development, and awareness-raising activities for enabling citizens to contribute to emissions reductions.

- **Directive on the Conservation of Wild Birds (1979) (Birds Directive)**

  Under this Directive, Member States are required to take the measures needed to preserve, maintain or re-establish a sufficient diversity and area of habitat for all species of wild birds naturally occurring in the European territory of Member States, at a level which corresponds in particular to ecological, scientific and cultural requirements, while taking into account economic and recreational requirements.

- **Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (1992) (Habitats Directive)**

  This Directive is a complement to the Birds Directive. It aims to contribute towards ensuring biodiversity through the conservation of natural habitats and wild fauna and flora in the European territory of Member States, with particular attention being paid to threatened species. The central feature of the Directive is the creation of a network of special areas of conservation, entitled Natura 2000.

# 7. HEALTH AND SAFETY

## 7.1 INTRODUCTION TO H&S REQUERIMENTS

The construction of an offshore wind farm involves many risks due to the different disciplines and tasks developed in different work environments, some of them similar to the regular risks appeared in general industry activities. For instance, many risks will be similar to common industrial works in land based workshops associated with machinery, electrical components, lifting loads, and so on.

Other risks will be specific for common marine and vessel jobs (but not only particular to offshore wind turbines neither offshore floating installations).

A location at sea introduces some extra challenges related to escape and evacuation, and work environment, compared to a land based installation:

- escape and evacuation will be dependent on some sort of floating devices (life rafts, lifeboats, or available standby, support or service vessels)
- there is added challenges related to access to and location for rest rooms, workshops etc.

A floating offshore wind turbine adds another level of challenges related to:

- the installation (depending on design) will have some normal level of movement and/or list.
- since the installation is not fixed, failure to hull, mooring, or turbine may cause excessive levels of movement, vibrations or list that may impair rescue, escape and evacuation
- the installation may sink if severely damaged.

Due to that, at least the following situations should be included when representative emergency scenarios are to be developed for a floating wind turbine structure:

- hull damage and leakage (loss of buoyancy)
- mooring failure
- confined space (asphyxiation/poisonous gas) – gas build up from seawater ballast tanks and decomposing marine substances in anchor chain compartments
- turbine/nacelle malfunction or breakdown - effect of abnormal stress and loads on a floating structure

## 7.2 H&S STANDARDS

Regarding legislation, there are a lot of standards and directives relative to sea activities, but not many specific for offshore wind turbines neither floating platforms. This is due to offshore wind energy is still a relatively new industry, so in many countries in lack of a complete set of legislation. It is mainly Northern Europe, Spain and the United States who have some legislation with variation in the level of detail.

We will give a brief presentation of the most relevant legislation than can be applicable to offshore wind farms construction and sea activities. Of course they are not specific for offshore floating wind turbines. Most of them come from general marine legislation, onshore wind farm construction and common industrial jobs, but can be also valid for offshore floating wind turbines. Some of the standards are applicable only to a specific country:

- SOLAS (Safety of Life at Sea) Consolidated Edition 2009. (It is generally regarded as the most important of all international treaties concerning vessels safety)
- Guidelines for health & safety in the Wind Energy Industry (2008) BWEA (British Wind Energy Association)
- Guidelines for health & safety in the Marine Energy Industry (2008), EMEC (European Marine Energy Centre -Orkney) in cooperation with BWEA.
- Guidance on UK Navigational Practice, Safety and Emergency Response Issues. MCA.
- MGN 371 (M+F) OREIs- Guidance on UK Navigational Practice, Safety and Emergency Response Issues
- IMO Resolution A.572 (14) .General provisions on ships' routeing.
- IMO Resolution A.671 (16). Safety zones and navigation around offshore installations.
- EN 50308. Wind Turbines. Protective measures. Requirements for design, operation and maintenance.
- ISO 19901-6. Offshore O&G Structures. Marine Operations
- EN ISO 14122-2:2001: Safety of machinery — Permanent means of access to machinery — Part 2: Working platforms and walkways.
- EN ISO 14122-3:2001. Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails.

- EN ISO 14122-4:2001. Safety of machinery — Permanent means of access to machinery — Part 4: Fixed ladders.
- ISO 15544 - Oil&Gas Requirements and Guidelines for Emergency Response
- ISO 17776:2000, Petroleum and natural gas industries / Offshore production installations / Guidelines on tools and techniques for hazard identification and risk assessment
- ISO 13702 Control and mitigation of fires and explosions on offshore O&G installations
- HSE 1990: Offshore installations: Guidance on design, construction and certification.
- API RP 2D. Operation and Maintenance of Offshore Cranes
- Guidelines for the Management of Offshore Helidecks Operations. Issue 4, 2003. UKOOA.
- Bird Guano Accumulations and their effect on Offshore Helicopter Operations. OTO 00:131. HSE
- Research on Offshore Helideck Environmental Issues. August 2000. CAA paper no. 99004
- API RP 2L: Planning, design and construction of heliports for fixed offshore platforms
- JAR/OPS 3.005 (Z) Helihoist operations
- BL 3-5. Regulations of helidecks on offshore installations. CAA-Denmark
- CAP 437 Chp. 10. Helicopter Winching Areas on Wind Turbine Platforms. CAA
- API SPEC 2C: Offshore pedestal mounted cranes
- EN 50308: Wind turbines. Labor safety
- IALA's O-139: Marking of man-made Offshore Structures
- EN 50308. Wind Turbines. Protective measures. Requirements for design, operation and maintenance. CENELEC.
- Guidelines for Health & Safety in the Wind Energy Industry. BWEA
- MGN 371 (M+F). Offshore Renewable Energy Installations (OREIs)
- Methodology for Assessing the Marine Navigational Safety Risks of Offshore Wind farms. DTI-MCA-BMT Renewables. BERR.
- O-139. The Marking of Man-Made Offshore Structures Recommendation. IALA
- EN 13135-1. Cranes. Safety. Equipment requirements. Part 1: Electrical.
- EN 13135-2. Cranes. Safety. Equipment requirements. Part 2: Non electrical.
- EN ISO 12100-2 Safety of machinery. Basic concepts, general principles for design.
- F.E.M. 1.001 Rule for the design of hoisting appliances.
- ISO 4308-1. Cranes and lifting appliances. Selection of wire ropes.
- EN 954-1 Safety of machinery. Command systems.
- EN 13411 Terminations for steel wire ropes. Safety

- EN 983. Safety of machinery. Safety requirements for fluid power systems and their components. Pneumatics.
- EN 982. Safety of machinery. Safety requirements for fluid power systems and their components. Hydraulics.
- EN 13557. Cranes. Controls and control stations.
- ISO 8566-1. Cranes. Cabins and control stations.
- EN 61310. Safety of machinery. Indication, marking and actuation.
- EN 842. Safety of machinery. Visual danger signals. General requirements, design & testing.
- EN 418 Safety of machinery. Emergency stop equipment, functional aspects. Design.
- EN 12077-2. Cranes Safety. Requirements for Health and Safety.
- EN 14492-1. EN 14492-1. Cranes. Power driven winches and hoists. Part 1. Winches
- EU Directive 98/37/CE
- EU Directive 98/79/CE
- DNV Rules for Planning and Execution of Marine Operations; Part 2, Chapter2-4
- GL Rules and Guidelines. IV Industrial Services. Part 6- Offshore Technology
- IMO Resolution A.671 (16). Safety zones and navigation around offshore installations.
- HSG221: Technical Guidance on safe use of lifting equipment offshore
- EN 1838: Emergency lighting
- GL Guidelines Certification of fire protection systems for wind turbines .2009
- NVIC 02-07: Guidance on USCG's roles and responsibilities for Offshore Renewable Energy installations
- EN 292-1 Safety of machinery- Basic concepts, general principles for design. Part 1: Basic terminology, methodology.
- EN 292-2 Safety of machinery- Basic concepts, general principles for design. Part 2: Technical principles and specs.
- EN 982 Safety of machinery. Safety requirements for hydraulic and pneumatic systems and parts. Hydraulics.
- EN 983 Safety of machinery. Safety requirements for hydraulic and pneumatic systems and parts. Pneumatics.
- ISO 12100-1: Safety of machinery — Basic concepts, general principles for design - Part 1: Basic terminology, methodology.
- EN 50160 Voltage characteristics of electricity supplied by public distribution systems
- EN 50172 Emergency escape lighting systems

- EN ISO 11202 Acoustics - Noise emitted by machinery and equipment - Measurement of emission sound pressure levels at a work station and at other specified positions- Survey method in situ.
- ISO 4871 Acoustics – Determination of sound power levels of noise sources using sound pressure – Engineering method in an essentially free field over a reflecting plane
- EN 418 Safety of machinery - Emergency stop equipment, functional aspects
- EN 1037 Safety of machinery – Prevention of unexpected start up.
- EN 457 Safety of machinery – Auditory danger signals. General requirements, design and testing.
- ISO 7731 Ergonomics. Danger signals for public and work areas. Auditory danger signals.
- EN 981 Safety of machinery – System of auditory and visual danger information signals.
- EN 795 PPE against falls from a height. Anchorage devices- Requirements and testing.
- EN 1050 Safety of machinery. Principles for risk assessment.
- UNE-EN 13852-1:2005/AC: 2007. Grúas marítimas para uso general
- Convenio sobre búsqueda y salvamento marítimo (SAR 79). Organización y procedimientos de los servicios de búsqueda y salvamento
- Sistema de balizamiento marítimo de la Asociación Internacional de Señalización Marítima (AISM). Normas de balizamiento de canales y obstáculos varios que puedan representar un peligro para la navegación.
- Resolución 851 de la 20 Asamblea de la Organización Marítima Internacional (OMI Res.851 (20). Código para la investigación de siniestros y sucesos marítimos.
- Ley 60/62. Regula lo relativo a las extracciones de restos hundidos, hallazgos de material en el mar, el remolque y los auxilios y salvamento en la mar.
- Decreto 984/67. Reglamento para la aplicación de la Ley 60/62
- R.D. 1835/83. Normas de balizamiento en las costas españolas.
- Orden 14.4.88. Por la que se establece la Comisión para la investigación de los siniestros marítimos.
- Ley de Prevención de Riesgos Laborales. Ley 31/1995 de 8 de noviembre de 1995
- R.D. 171/2004, de 30 de enero, por el que se desarrolla el art. 24 de la Ley 31/1995, en materia de Prevención de Riesgos Laborales, y corrección de errores, BOE 60, de 10/03/2004
- OHSAS 18001, Sistemas de gestión de seguridad y salud ocupacional. Requisitos
- OHSAS 18002, Sistemas de gestión de seguridad y salud ocupacional. Guía para la implementación de OHSAS 18001.
- Ley 54/2003, de 12 de diciembre, de reforma del marco normativo de la prevención de riesgos.

- Reglamento de los Servicios de Prevención (R.D. 39/1997).
- Real Decreto 485-1997 (Señalización Seguridad Laboral)
- REAL DECRETO 407/1992, de 24 de abril, que aprueba la Normativa Básica de Protección Civil.
- REAL DECRETO 39/1997, de 17 de enero, por el que se aprueba el Reglamento de los Servicios de Prevención y su modificación posterior.
- REAL DECRETO 485/1997, de 14 de abril, sobre disposiciones mínimas en materia de señalización de seguridad y salud en el trabajo.
- REAL DECRETO 486/1997, de 14 de abril, por el que se establecen las disposiciones mínimas de seguridad y salud en los lugares de trabajo.
- REAL DECRETO 773/1997, de 30 de mayo, sobre disposiciones mínimas de seguridad y Salud relativas a la utilización por los trabajadores de equipos de protección individual.
- REAL DECRETO 1215/1997, de 18 de julio, por el que se establecen las disposiciones mínimas de seguridad y salud para la utilización por los trabajadores de los equipos de trabajo.
- R.D. 1627/1997 Disposiciones mínimas de Seguridad y Salud en las Obras de Construcción.